Study Guide

I am excited that you are on the journey to get your AWS Certified Cloud Practitioner certification. This study guide is meant to complement the AWS Cloud Practitioner video courses on Pluralsight.

Here are a few tips to help you get the most out of these resources:

1. Print this out before you start the video courses.
2. Follow along with the courses and fill out areas in this document as you watch the course. You'll notice that the module names in the course are the bold headings here in these notes. In addition, clips in the module have their titles in this document too. Not all clips have notes.
3. Review your notes against the completed notes that can be found linked from the Module Wrap Up sections in this guide and in the Exercise files tab download available on each course page.
4. Keep this document after you finish the course as a part of the materials you will use to study for the exam.

Remember, this course is just the first step in your journey to achieve this certification. Follow along with the courses in this path, and then register for the exam.

Don't forget to reach out on Twitter and LinkedIn to let me know how you are doing along the way.

David Tucker

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Certification Overview

by Pavneet Singh

Cloud services integration and architect development are skills integral to developing a modern app. The adoption of cloud services is a de-facto standard in the IT industry. AWS is the most popular cloud services provider; it is constantly evolving and the ability to work with AWS is considered one of the prominent skills in the IT industry.

The AWS Certified Cloud Practitioner certification is intended to provide fundamental knowledge of AWS infrastructure to build and validate the basics of AWS apps.

Certification Objective

The AWS Certified Cloud Practitioner certification is designed for its applicants to learn about the AWS platform from scratch. The objectives of this certification are:

- Introduction to AWS cloud infrastructure at a global level
- An overview of AWS services with compliance
- Basics of AWS design and architectural principles
- AWS billing structure and support documentation

This certification will allow you to fill the communication gaps between developers, management, and clients. Furthermore, it serves as a foundation towards achieving AWS Architect, Developer, and Operations certifications.

Course Curriculum

The course curriculum of the AWS Certified Cloud Practitioner certification can be put into four categories:

- Cloud - Introduction to cloud computing: SaaS, PaaS, and IaaS.
- Services - This includes the following services:
    - Computing and data processing (EC2, Lambda) to manage virtual machines and event-driven computation
    - File Storage (S3) to store and access objects efficiently
    - Networking (VPC, Route 53) to configure networks and routing
    - Database to store SQL (RDS) and NoSQL (DynamoDB, SimpleDB) data
    - Notification (SNS) services for portable devices like cell phones
    - Message (SQS) storage and transfer service for communication and process management
    - Others: Time Sync for accurate current time and CloudFormation to automate work, etc.
- Security - Shared Security Model, Compliance and Artifact, Web Application Firewall(WAF), Inspector, Trust Advisor, CloudTrail, Cloud Watch, Identity and Access Management (IAM) services

- Billing - The pricing and billing structure of different services as per usage, quota, and plans

Amazon provides a one-year free subscription plan for practice and learning, though it requires credit or debit card details to confirm your identity. Students and educators can also take advantage of the AWS Educate program.

Prerequisites and Recommended Skills

There is no prerequisite for the AWS Certified Cloud Practitioner certification, though there are some recommended skills:

- Basic Terminology - Every field has jargon, so it is recommended that you familiarize yourself with basic terms and technologies to escalate the learning process. Follow the AWS glossary that provides short explanations about AWS and IT-specific terminologies.
- Tools - Learning tools and technologies like terminal/command-prompt and OS services (processing, privileges, file system, etc.) can be quite helpful in understanding the concepts of AWS implementation and development.
- AWS Fundamentals - AWS Fundamentals is a collection of AWS core concepts to build scalable apps with best practices.

Certification Process Details

The final stage of the certification process is the exam. The crucial attributes of the exam are:

- Format - The exam is comprised of multiple-choice questions, and answers can have multiple correct choices. Marks are only given if only the correct choice(s) are selected.
- Scores - The criteria for passing scores is set by using statistical analysis and is subject to change. Points are not given for incorrect answers.
- Method - The exam can be taken online (proctored exam) or given at a physical test center provided by PSI or Pearson VUE. The benefit of opting for a physical test center is the opportunity to grow your professional network.

For an online proctored exam, applicants must be able to speak English to communicate with a proctor, who will monitor the testing environment. Online proctoring exams are not available for candidates in mainland China, Japan, Slovenia, or South Korea. More details are available here. You can find additional information about system requirements and policies here.

Due to COVID-19, test delivery providers have released strict guidelines for safety measures. Follow PSI guidelines here and Pearson VUE guidelines here for testing center availability and safety measures.

- Time - The duration of the exam is 90 minutes, though it could vary in the future depending on the content.
- Charges - There is a one-time fee of $100 for an AWS Certified Cloud Practitioner exam.
- Beta Program - Amazon has a beta program for certification with changes to the exam's outline or new certifications. Early access is available to a limited number of candidates (on a first-come, first-served basis) who can take the beta exam as well as

the stable exam once it's out of beta. This allows applicants to take the exam twice without any additional fee. The beta program also provides the benefit of 50% off of the standard exam pricing.

- Attempts - There is only one chance to clear the exam, though there is an option of a practice exam with an additional fee of $20.
- Additional Details - The exam can be rescheduled up to 24 hours before the scheduled exam time; otherwise there will be no refund and the next exam can be scheduled only after 24 hours. In case of unsuccessful attempts, the next exam can be scheduled after 14 days with the same fee, though you can use vouchers to retake the exam.

The AWS Certified Cloud Practitioner certification is valid for three years. The certificates will be available within five working days after a positive exam result.

Details about content and pricing vary, so make sure to verify it here.

Job Market

The AWS Cloud Practitioner qualifies you to apply for the jobs that have cloud knowledge as a required or preferred skill. It is useful for people from technical, managerial, sales, or finance fields who want to grow into their role for growth or better opportunities. It is highly recommended for people who want to join the cloud industry with the ability to clearly and concisely communicate with technical and non-technical stakeholders across all levels of the organization.

There are numerous jobs available in the IT industry that have AWS knowledge listed as a preferred skill, such as:

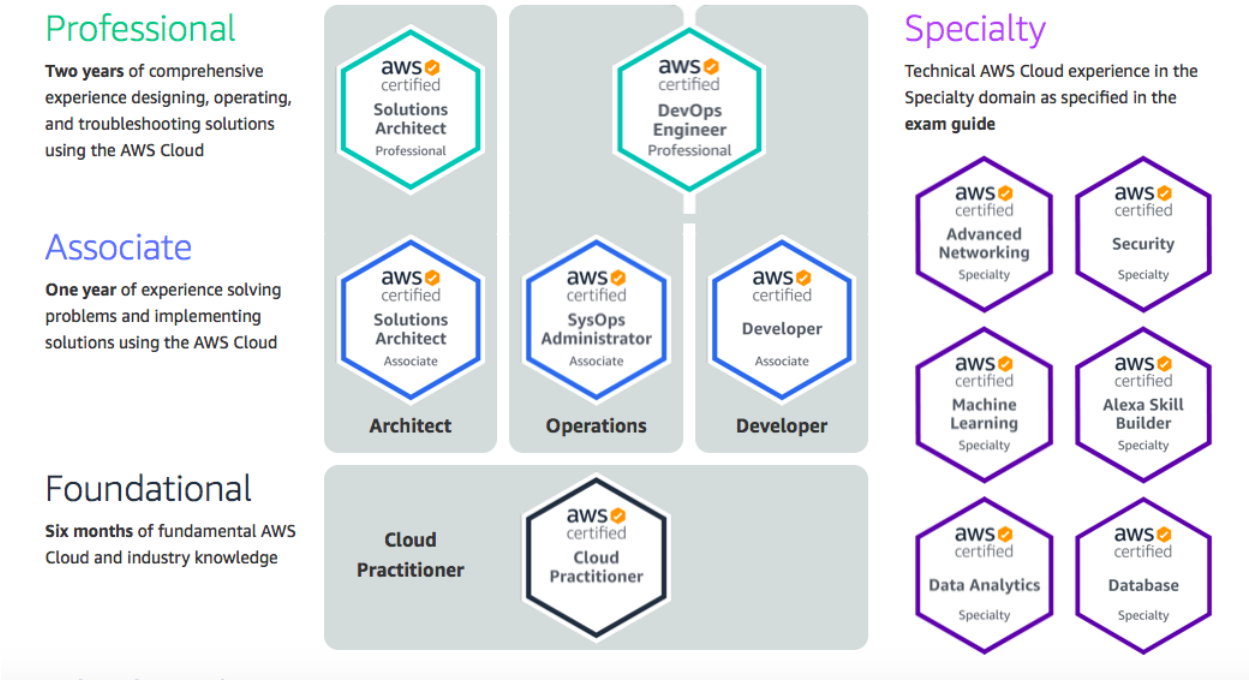
- Full Stack AWS Developer
- AWS Customer Service
- AWS Customer Service Manager

Compensation is relative to the desired skills as per the industry. According to LinkedIn, the average annual salary for an AWS software engineer is US$108,000. Basic knowledge of AWS cloud can significantly increase your chances of getting placed into the cloud market.

Certification Path

AWS offers various certifications to build a career in the cloud market as an expert.

- AWS Certified Solutions Architect: For cloud architect roles to develop the app architecture using specific AWS services as per requirements.
- AWS Certified SysOps Administrator: For system administrator roles to monitor data, security, performance, the cost for AWS services with performance tools and metrics.
- AWS Certified Developer - Associate: For developer roles to integrate AWS services into apps via AWS tools and SDKs.



AWS also offers certifications in specific fields like networking, Security, machine learning, data analysis, Alexa skills, databases and much more.

There are no prerequisites so anyone can proceed without having any prior AWS certifications, even for professional certifications. You can find guides like this one that cover information on other certifications here.

Pluralsight Resources

Pluralsight offers a curated learning path specifically designed for the AWS Certified Cloud Practitioner (CLF-C01) certification that includes:

- Fundamental Cloud Concepts for AWS
- Understanding AWS Core Services
- Introduction to Security and Architecture on AWS
- Project to Deploy a Static Site on AWS

Pluralsight's Role IQ is also a great resource to measure your skill level.

- Role IQ: Developer on AWS

Other Resources

Below is a list of other helpful resources for practice and insights.

Study Material

- AWS Training Material
- AWS Cloud Practitioner Essentials (Classroom)
- AWS Cloud Practitioner Essentials
- Exam guide
- Sample exam questions

Tools

- AWS Total Cost of Ownership (TCO) Calculator

Whitepapers

- AWS Whitepapers
- Pricing

Conclusion

- Prepare yourself with the mock tests and follow the updated study material.
- Dedicate a specific time slot to each question for effective time management and read all options carefully to find the most optimal answer.

Fundamental Cloud Concepts in AWS

Understanding Cloud Computing

Learning Outcomes

- Setup an AWS Test Account
  - While this isn't required for the exam, it will prove to be helpful throughout the entire path
- Understand Traditional Data Centers
  - Know the challenges that exist when working with traditional data centers
- Understand Cloud Computing
  - You should be able to compare and contrast cloud computing with traditional data centers
  - You should understand the following terms:
    - Elasticity
    - Reliability
    - Agility
  - You should understand the differences between the following cloud computing models:
    - Infrastructure as a Service (IaaS)
    - Platform as a Service (PaaS)
    - Software as a Service (SaaS)
  - Know the different cloud deployment models:
    - Public Cloud
    - Private Cloud
    - Hybrid Cloud

Links You'll Need

- AWS Home Page (to signup for an account)
- AWS Console

Setting up an AWS Account

While this portion isn't required for the test, it can be helpful in testing the services and concepts in this learning path.

After setting up your account in the video, make sure to follow all of the steps to the end to create a billing alarm. These steps are detailed below:

1. From the AWS Console, select the dropdown from your user name and then select My Billing Dashboard.

2. From the left navigation select **AWS Budgets**.
3. Select the option to **Create Budget**.
4. Make sure **Cost Budget** is selected and then select **Set Your Budget**.
5. Enter a name and budgeted amount and then select **Configure Alerts**.
6. Enter an alert threshold and your email address and select **Confirm Budget**.

Traditional Data Centers

Traditional data centers present challenges for organizations:

1. Large up-front investment
2. _____
3. _____
4. Maintaining data centers is expensive
5. You own all of the security and compliance burden

Benefits of Cloud Computing

AWS lists six key Advantages of Cloud Computing:

1. Trade _____ expense for _____ expenses
2. Benefit from _____
3. Stop guessing _____
4. Increase speed and _____
5. Stop spending money maintaining data centers
6. Go global in _____

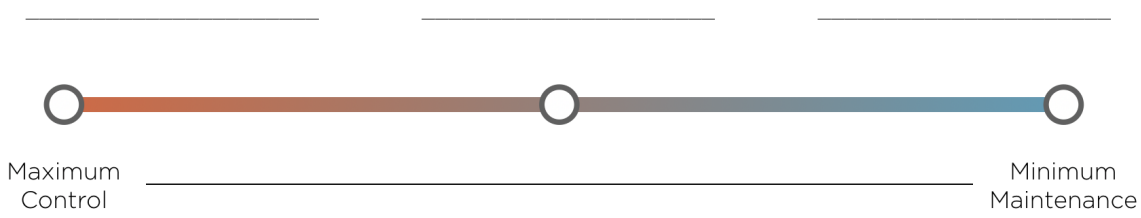
"_____ is the ability to acquire resources as you need them and release resources when you no longer need them. In the cloud, you want to do this automatically."

Well-Architected Framework, Amazon Web Services

Types of Cloud Computing

Write the definition of Cloud Computing provided by AWS:

Enter the three different cloud computing models discussed in the clip:



Enter the name of each cloud computing deployment model below:

_____ Deployed onto a public cloud provider like AWS, Microsoft Azure or the Google Cloud Platform.

_____ Deployed in a private data center using a cloud-like platform provided by vendors like VMWare.

_____ Deployed with a mix of the previous two options using both a provided like AWS alongside a cloud-like platform in a private data center.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Roger's company runs several production workloads in its data center
- They are using VMWare to manage infrastructure in their data center
- They want to use AWS and integrate it with their data center for new workloads
- Which cloud deployment model would his company be following?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Eliza's company is trying to decide whether to fund a new line of business
- Eliza's team is looking to monetize a new emerging technology
- This new line of business will require new infrastructure
- What benefit of cloud computing would be most relevant to her company?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Jennifer is the CTO at an insurance company
- They are considering moving to the cloud instead of co-locating servers
- They want to make sure they have maximum control of the cloud servers
- Which cloud computing model would they need to leverage?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Fundamental Cloud Concepts in AWS. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

AWS Global Infrastructure

Learning Outcomes

- Be able to list the three key elements of AWS Global Infrastructure:
  - AWS Regions
    - Understand what constitutes a region
  - AWS Availability Zones
    - Understand what makes up an availability zone
  - AWS Edge Locations
    - Know which services leverage edge locations
- Understand how each of these factor into solutions built on the platform

Links You'll Need

- AWS Infrastructure Visualization
- AWS Regions and Availability Zones

Overview

The three primary elements of AWS Global Infrastructure are:

1.

2.

3.

AWS Regions and Availability Zones

An AWS _____ represents a cluster of data centers in a specific geographic location.

An AWS _____ consists of one or more data centers.

The primary purpose of an AWS Availability Zones is to:

AWS Edge Locations

The acronym CDN stands for _____ _____

_____.

AWS utilizes Edge Locations for the services _____ and

_____.

The primary purpose of an AWS Edge Locations it to:

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Jane's company is looking to transition to AWS
- They are starting with a few workloads
- It is a requirement to store backup data in multiple geographic areas
- Which element of AWS global infrastructure will best suit this need?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Tim's company serves content through their site to users around the globe
- They are looking to optimize performance to users around the world
- They want to leverage a Content Delivery Network (CDN)
- Which element of the AWS global infrastructure will be used in this case?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Ellen's company is transitioning one of their legacy applications to AWS
- This application requires uptime of at least 99.5%
- They want to be sure any issues at a single data center don't cause an outage
- Which element of the AWS global infrastructure supports this need?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Fundamental Cloud Concepts in AWS. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Understanding Cloud Economics

Learning Outcomes

- Know the difference between two types of expenses and how they differ between traditional/cloud infrastructure:
  - CapEx
  - OpEx
- Know the definition and use of:
  - Resource Tags
  - AWS Cost Explorer
  - AWS TCO Calculator
  - AWS SImply Monthly Calculator
- Be able to explain consolidated billing with AWS Organizations

Links You'll Need

- AWS TCO Calculator
- AWS Simple Monthly Calculator
- AWS Cost Explorer (in AWS Console)

Overview

When building a data center, an organization invests in upfront costs for the building, servers, and supporting equipment. This type of expense to attain a fixed asset is referred to as a _____ or_____.

The regular day to day expenses of a business are considered _____ or _____. After the initial build of a data center, ongoing connectivity, utility, and maintenance costs would be considered _____ .

Fill in the diagram below:

Manage Your Own Data Center	Leverage Cloud Infrastructure
Large up-front costs (CapEx)	
	You Pay as You Go for Infrastructure (OpEx)
	Capacity Scales to Meet User Demand and Can Be Provisioned Immediately
Monthly Costs will Map to Predicted Infrastructure Needs	

Organizing and Optimizing AWS Costs

AWS _____ is a user interface for reviewing AWS costs, forecasting future costs, and providing recommendations for cost optimization.

AWS _____ is a tool for generating a report for making a case to move to the cloud.

AWS _____ is a tool for estimating the cost of running specific AWS infrastructure.

You can segment your AWS costs by adding metadata to your AWS resources. This metadata is called _____ .

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Oscar's company has multiple departments that work within AWS
- Finance is asking for a clean separation of AWS costs between departments
- Currently all resources are included within a single AWS account
- What approach would meet this need for future costs with minimal effort?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Cindy's company is considering a transition to the cloud
- They currently have two physical data centers that they own and maintain
- Stakeholders are questioning whether this approach will save money
- Which approach should Cindy take to make a case for the cloud?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- William is a web developer at his company
- Given some recent downtime he is looking at moving their site to the cloud
- Finance is asking for an estimate of costs for this transition to AWS
- What approach should William take to get this data to his finance team?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Fundamental Cloud Concepts in AWS. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Supporting AWS Infrastructure

Learning Outcomes

- AWS Support Plans
  - Understand differences between plans
  - Be able to select a plan tier based on needs
- Understand use of support tools:
  - AWS Trusted Advisor
    - Know the categories of recommendations provided
  - AWS Personal Health Dashboard
- Understand resources available to assist in cloud implementation:
  - AWS Quick Starts
  - AWS Partner Network - Consulting Partners
  - AWS Professional Services

Links You'll Need

- AWS Trusted Advisor (in AWS Console)
- AWS Personal Health Dashboard (in AWS Console)
- AWS Support Plans
- AWS Quick Starts
- AWS Partner Network
- AWS Professional Services

Overview

" AWS _____ provides alerts and remediation guidance when AWS is experiencing events that may impact you." - Amazon Web Services

AWS _____ is an automated tool for checking your AWS usage against best practices.

AWS Trusted Advisor provides recommendations in the following five categories:

1.

2.

3.

4.

5.

AWS Support Plan Tiers

Communication Methods for Technical Questions

Check the cells below for which communication methods are supported with the support plan.

Support Plan	Email	Chat	Phone
Basic			
Developer			
Business			
Enterprise			

Support Response Times

Enter in the cells below the response times for each incident type based on the support plan (some cells will remain empty).

Incident Type	Developer	Business	Enterprise
General Guidance	24 Business Hours		
System Impaired		12 Hours	
Production System Impaired			4 Hours
Production System Down			
Business Critical System Down			

When You Need Help

_____ provides step by step deployment instructions for common technology platforms on AWS.

AWS Partner Network _____ Partners are third party consultants that have met the criteria to be in the AWS partner program. These people can assist with your cloud implementation.

AWS _____ _____ enables you to utilize AWS employees for assistance as consultants in your cloud implementation.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Sylvia's company is in the process of moving multiple workloads into AWS
- One of these workloads is a mission critical application
- Her CTO says that they need to be able to call support 24 hours a day
- What is the most cost effective support plan that meets this criteria?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Edward's company is evaluating AWS for future workloads
- One of the workloads supports multiple offices globally
- The company needs to be able to call, text, or email support if an issue occurs
- The company also needs a response from support in 15 minutes
- What is the most cost effective support plan that meets this criteria?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- William has an AWS account for a personal project
- He doesn't expect to need technical guidance from AWS
- He does want access to the AWS Trusted Advisor core checks
- What is the most cost effective support plan that meets this criteria?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Fundamental Cloud Concepts in AWS. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

For More Information

As a part of creating this course, the following resources from Amazon Web Services were referenced. If you want to learn more, feel free to go check out these resources directly:

- What is Cloud Computing
- Overview of Amazon Web Services (Whitepaper)
- AWS Well-Architected Framework

Understanding AWS Core Services

Interacting with AWS

Learning Outcomes

- Interaction Methods
  - AWS Console
    - You should know what use cases would be best to be done within the AWS console
    - Know how to login to the consol
  - AWS Command Line Interface (CLI)
    - You should know when it would make sense to leverage the CLI
    - Know where to find the installation instructions for your platform
  - AWS Software Development Kit (SDK)
    - Know when the use of the SDK makes sense

Links You'll Need

- AWS Console
- AWS CLI Installation Instructions
- AWS SDKs

Methods of Interacting with AWS

Three methods of interacting with AWS services:

1. _____
2. _____
3. _____

The AWS Management Console is a _____ and _____ based interface for interacting with most all of the 150+ AWS services. All major browsers and mobile operating systems are supported.

The AWS SDK is supported in the following languages:

_____ _____ _____

_____ _____ _____

_____ _____ _____

Using the AWS CLI

Generating an access key:

1. Log into the AWS Console.
2. Select your username in the top bar, and select My Security Credentials in the dropdown menu.
3. Next, select the Access Keys option.
4. Select the option to Create New Access Key (if this is a root account, you should delete these when you are done with them)
5. Download your key file
6. Install the CLI based on the installation instructions
7. Run aws configure and pass in the access key and secret key that you just created.

You should now be able to leverage the AWS CLI at this point.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Roger's company runs several production workloads in AWS
- They have a new web application that manages digital assets for marketing
- They need to automatically create a user account in Amazon Cognito on sign-up
- They want this step seamlessly integrated into the application
- Which interaction method would Roger's company use for this?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Eliza's company is considering transitioning to AWS
- They want to leverage Amazon Relational Database Service
- Eliza wants to test out a single database on the service
- What interaction method would Eliza use for this use case?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Jennifer's company is a startup
- They created a social network for entrepreneurs with a web and mobile app
- Jennifer has a set of tasks she needs to run on AWS each day to generate reports
- What interaction method would Jennifer use for this use case?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Compute Services

Learning Outcomes

- Understand the three different compute services that we introduced in this module:
  - Amazon EC2
    - Be able to define EC2 and what it does
    - Know what instance types are for EC2 and what capabilities they cover
    - Know when to use the different purchase types for EC2
    - Understand what an AMI is and what it provides to an EC2 instance
  - AWS Elastic Beanstalk
    - Be able to explain what Elastic Beanstalk is and how it differs from EC2
    - Know the different capabilities that are included with the service
  - AWS Lambda
    - Be able to define Lambda and explain how it differs from both EC2 and Elastic Beanstalk
    - Understand how you are charged for Lambda usage
    - Note that Lambda is the core of a serverless approach

Links You'll Need

- Amazon EC2
- AWS Elastic Beanstalk
- AWS Lambda
- AWS Elastic Beanstalk - Sample Applications

Amazon EC2 Overview

" _____ is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers." - Amazon Web Services

The four concepts that we need to know to launch an EC2 instance are:

1.
2.
3.
4.

The instance type defines the _____, memory, and

_____ .

The two root device types for an EC2 instance are:

_____ - Ephemeral storage that is physically attached to the host the virtual server is running on

_____ - Persistent storage that exists separately from the host the virtual server is running on

Amazon EC2 Purchase Types

Amazon EC2 Purchase Options

1. _____ - You pay by the second for the instances that are launched
2. _____ - You purchase at a discount instances in advance for 1-3 years

3. _____ - You can leverage unused EC2 capacity in a region for a large discount

Reserved Instance Cost Models:

_____ - Entire cost for the 1 or 3 year period is paid upfront

_____ - Part of 1 or 3 year cost is paid upfront along with a reduced monthly cost

_____ - No upfront payment is made, but there will be a reduced monthly cost

Launching EC2 Instances

1. Log into the AWS Console.
2. Open the EC2 service dashboard (search for EC2 in the 'Find Services' input).
3. Select the **Launch Instance** option.
4. Select the Amazon Linux 2 AMI.
5. Be sure that the **t2.micro** instance type is selected (it should be selected by default). Select the **Next** button.
6. Set the **Auto-assign Public IP** option to **Enable**.
7. Scroll down to **Advanced Details** and open these settings. In the **User data** field, enter the text included below these instructions. Select the **Next** button.
8. Leave the storage settings with their default values. Select the **Next** button.
9. Add tags if you would like. Select the Next button.
10. In the Configure Security Group settings view, change the Source for the SSH type to be **My IP Address**.
11. Next, select the **Add Rule** button. In the new role, set the type to be **HTTP**. Select the **Next** button.
12. Next, select **Launch**.
13. Create a keypair (if you don't have one) and then select **Launch Instance**.
14. Next, select the ID of the server that you just launched.
15. Once the instance has transitioned from pending to running, copy the public DNS into your browser. You should see the test page in your browser.
16. Finally, back in the AWS console select the instance and then navigate to **Actions**. Select **Instance State - Terminate**. Confirm your decision.

User Data:

```
#!/bin/bash
yum install httpd -y
service httpd start
```

AWS Elastic Beanstalk Overview

Elastic Beanstalk is a _____ as a service solution on AWS.

Note the Supported Application Platforms for Elastic Beanstalk:

Launching an App on Elastic Beanstalk

1. Navigate to the Elastic Beanstalk Tutorials and Samples page. Select a sample application to download to your local machine.
2. Log into the AWS console and navigate to the Elastic Beanstalk service page.
3. If you see the "Welcome to AWS Elastic Beanstalk" screen, select **Get Started**.
4. In the screen that follows, give your application a name and select the platform (it will need to be the same platform as the sample application you downloaded.
5. Select the option to upload your code, and then upload the zip file you downloaded that contains your sample application.
6. Select the option to **Configure More Options**.
7. Next, review the settings for this environment. Select **Create app**.
8. Wait for the application and then navigate to the URL near the top of the page.
9. After viewing the application, navigate back to the console and select **Actions - Terminate Environment.**

AWS Lambda Overview

"_____ lets you run code without _____ or _____ servers. You pay only for the compute time you consume. You can run code for virtually any type of application or backend service - all with zero administration." - Amazon Web Services

AWS Lambda is the primary service for _____ architectures.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Sylvia's company is in the process of moving multiple workloads into AWS
- One workload is an application that will be leveraged for at least 5 more years
- The organization is looking to be as cost efficient as possible for its EC2 usage
- What EC2 purchase option should be chosen for this application?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Edward is looking to deploy his PHP web application to a virtual server
- He doesn't have experience managing EC2 instances on AWS
- He needs the ability to scale this application to meet user demand
- What is the best compute option for Edward based on this criteria?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Cindy's company is transitioning to the cloud for its data processing workloads
- These workloads happen daily and can start or stop without a problem
- This workload will be leveraged for at least one year
- What EC2 purchase option would be the most cost efficient choice?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Content and Network Delivery Services

Learning Outcomes

- Be able to explain the purpose of each of the following services:
  - Amazon Route 53
  - Amazon Virtual Private Cloud (VPC)
  - AWS Direct Connect
  - Amazon API Gateway
  - Amazon CloudFront
  - Elastic Load Balancing
- Be able to explain the differences between two cloud scaling approaches:
  - Vertical Scaling (scale up)
  - Horizontal Scaling (scale out)

Helpful Links

- Amazon Route 53
- Amazon VPC
- AWS Direct Connect
- Amazon API Gateway
- Amazon CloudFront
- Elastic Load Balancing

Amazon VPC and Direct Connect

Write the definition for Amazon Virtual Private Cloud (VPC):

_____ - A cloud service solution that makes it easy to establish a dedicated network connection from your data center to AWS.

Amazon Route 53

Amazon Route 53 is a _____ service (meaning it does not require region selection).

Elastic Load Balancing

Distributes traffic across multiple _____

Integrates with _____, _____, and _____.

Types of load balancers:

1.
2.
3.

Types of Scaling:

_____ Scaling - You “scale up” your instance type to a larger instance type with additional resources

_____ Scaling - You “scale out” and add additional instances to handle the demand of your application

Amazon CloudFront and API Gateway

CloudFront utilizes AWS _____ _____.

Supports both _____ and _____ content.

_____ is a fully managed API management service.

AWS Global Accelerator

The AWS Global Accelerator is a networking service that can route your traffic through the AWS _____ _____ _____ to improve performance.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Jane's company maintains two corporate data centers
- They want their data centers to work alongside AWS for specific workloads
- She is wondering if there is a way to have a persistent connection to AWS
- What service from AWS would you recommend her company implement?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Tim's company serves content through their site to users around the globe
- They are looking to optimize performance to users around the world
- They want to leverage a Content Delivery Network (CDN)
- Which service would enable optimized performance globally for their content?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Ellen's company has an internal application that runs on an EC2 server
- Currently there is downtime as demand is greater than capacity for the server
- Ellen is trying to decide if she should use bigger servers or more servers
- Which scaling approach would you recommend and what services should they use?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

File Storage Services

Learning Outcomes

- Be able to explain the core features of Amazon S3
  - Different storage classes
  - Multiple availability zone (durability)
  - URL file access
  - Lifecycle policies
  - S3 Transfer Acceleration
- Be able to identify when S3 Glacier or S3 Glacier Deep Archive would be a good choice
- Know the differences between the two EC2 storage options:
  - Elastic Block Store (EBS)
  - Elastic File Store (EFS)
- Understand when the data transfer services should be leveraged
  - AWS Snowball
  - AWS Snowmobile

Helpful Links

- Amazon S3
- Amazon S3 Glacier
- Amazon Elastic Block Store (EBS)
- Amazon Elastic File System (EFS)
- AWS Snowball
- AWS Snowmobile

Amazon S3 Overview

S3 Non-Archival Storage Classes

Storage Class	Description
	the default storage class and is for frequently accessed data
	will move your data to the correct storage class based on usage
	for infrequently accessed data with the standard resilience

	is for infrequently access data that is only stored in one AZ

_____ is a feature that can be enabled per bucket that allows for optimized uploading of data using the AWS Edge Locations as a part of Amazon CloudFront.

Hosting a Website on Amazon S3

1. Log into the AWS Console, and select the S3 service.
2. Click the **Create Bucket** button.
3. In the dialog, give the bucket a unique name and click **Next**.
4. In the next view, you can simply click **Next**.
5. Deselect the option to **Block all Public Access**. Once the warning appears you will need to click the checkbox in the acknowledgement. Click **Next**.
6. In the Review view, you can click the Create Bucket button.
7. Next, click on the newly created bucket in the list.
8. Next, click the **Upload** button. From the dialog, click the **Add Files** button.
9. Select the files from the exercise files. Click **Next**.
10. From the Permissions view, you can click **Next**.
11. In the properties view, leave the default storage class. Scroll down and set encryption to the **Amazon S3 Master Key**. Click **Next**.
12. From the Review view, click **Upload**.
13. Select the ps-logo.jpg file from the list. Attempt to navigate to the Object URL for this image.
14. Navigate back to the console and click on the image in the list. Click the permissions option to edit the permissions.
15. Scroll down to the section titled **Public Access** and select the **Everyone** group.
16. Be sure that **Read object** option is selected in the dialog. Click **Save**.
17. Reload the image URL, and it should load without issue.
18. Back in the console, navigate to the bucket and then select the Properties tab.
19. From the properties tab, select Static Website Hosting.
20. Next, select the option to **Use this bucket to host a website**. Enter index.html for the index document, Click **Save.**
21. Navigate to the URL for the static website hosting option. You will see that it is forbidden.
22. Next, navigate back to the console and select the index.html file. Update the permissions just as you did for the image.
23. Next, navigate back to the static website hosting URL. The site should now work.

Glacier and Glacier Deep Archive

Both S3 Glacier and Glacier Deep Archive are designed for _____ of data within S3 as a separate storage class.

Fill in the missing spots in the table below comparing S3 Glacier with S3 Glacier Deep Archive:

S3 Glacier	S3 Glacier Deep Archive
Designed for archival data	
	Can be retrieved in hours
You pay a fee for GB retrieved	

Elastic Block Store

Amazon Elastic Block Store (EBS) is _____ storage designed to be connected to a single _____ instance that can scale to support _____ of data and supports multiple volume types based on need.

Please fill in the following table related to EBS volume types:

Volume Type Name	Description
General Purpose SSD	
	high performance volume for low latency applications
	is designed for frequently accessed data
Cold HDD	

Elastic File System

Amazon Elastic File System (EFS) is a fully managed _____ file system designed to support _____ workloads.

Amazon FSx for _____ is a fully managed native Windows file system.

Data Transfer with AWS Snowball

Please fill in the following table related to data transfer services on AWS:

AWS Snowball	AWS Snowmobile
Designed for large-scale data transfer	
	Supports exabyte scale transfer
Physical device is delivered by AWS	
	AWS will load data into S3 when the container is received at an AWS location

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Elaine launched a site that offers daily tutorials for developers
- She uses S3 to store the assets needed per tutorial
- These assets are very popular within the week the tutorial is launched
- After this initial week, these assets are rarely accessed
- How could Elaine reduce her S3 costs while maintaining durability?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Esteban works for a social networking company and they are moving to AWS
- They have 2 PB of user-generated content that they need to migrate
- Esteban is trying to determine if there is a faster than uploading over the internet
- Would there be another approach you would recommend for Esteban's company?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Emily works for a company that produces a messaging app
- She is looking for a shared file system between 8 different Linux EC2 instances
- The file system would need to support roughly 1 PB of data
- What approach would you recommend for Emily?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Database Services and Utilities

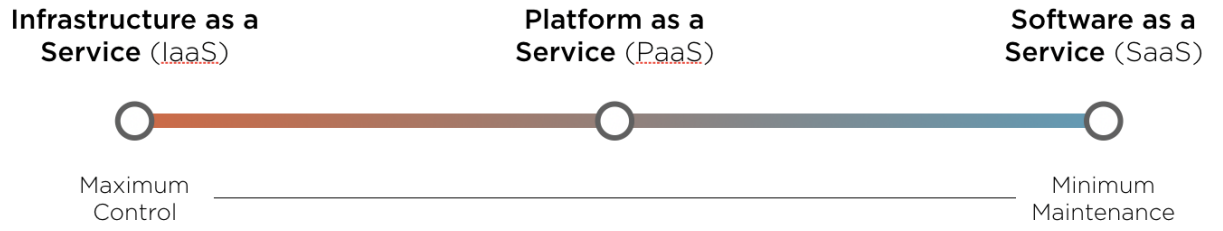
Learning Outcomes

- Be able to define the following database services:
  - Amazon Relational Database Service (RDS)
    - Understand what the Amazon Aurora database engine is within RDS
  - Amazon DynamoDB
  - Amazon Elasticache
- Be able to define the following data warehousing services and know when they would be used
  - Amazon Redshift and Redshift Spectrum
- Know when someone would leverage the AWS Database Migration Service

Helpful Links

- Amazon RDS
- Amazon Aurora
- Amazon DynamoDB
- Amazon Redshift and Redshift Spectrum
- Amazon Elasticache
- AWS Database Migration Service

Overview



Amazon Relational Database Service

Amazon RDS is a fully managed service for _____ databases.

Supported Amazon RDS Platforms:

1.
2.
3.
4.
5.
6.

"_____ is a MySQL and PostgreSQL-compatible relational database built for the cloud, that combines the performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open source databases." - Amazon Web Services

Amazon DynamoDB Overview

Amazon DynamoDB is a fully managed _____ database service.

"DynamoDB can handle more than _____ requests per day and can support peaks of more than _____ requests per second." - Amazon Web Services

Amazon Elasticache & Redshift

Amazon Elasticache is an in-memory data store that supports the _____

and _____ engines.

Enter the service name based on the description:

Service	Description
	Data warehousing solution that supports petabytes of data
	Service that enables querying exabytes of data stored in S3

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Jennifer is an IT executive in a financial services company
- They are transitioning their data warehouse to AWS for analysis
- The data warehouse would need to support up to 2 PB of data
- Which approach would you recommend for Jennifer?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Sam is a DevOps engineer at a tech company
- Sam needs to launch a MySQL database for a new web application
- They need to have direct access to the virtual server that MySQL is running on
- What approach would you recommend for Sam's company?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Frank is the CTO at a gaming company
- They are trying to determine how to store realtime user analytics
- They need low latency and the ability to scale to handle up to 1 million players
- Frank wants to minimize the amount of time it takes to maintain the database
- Which AWS approach would you recommend for Frank?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

App Integration Services

Learning Outcomes

- Be able to define the AWS messaging services but also know the differences in how they work
  - Amazon Simple Queue Service (SQS)
    - Know the two types of queues and how they are different
    - Be able to explain how SQS can enable fault tolerance
  - Amazon Simple Notification Service (SNS)
- Understand the purpose of AWS Step Functions and how they are defined

Helpful Links

- Amazon Simple Queue Service (SQS)
- Amazon Simple Notification Service (SNS)
- AWS Step Functions

AWS Messaging Services

Fill in the service in the table based on the description:

Service	Description
	Fully managed pub/sub messaging service
	Fully managed message queue service

Within Amazon SNS, messages are organized according to _____ .

Within Amazon SQS, messages are organized into _____. There are two types of these. They are _____ and _____.

AWS Step Functions

_____ enables orchestration of workflows through a fully managed service.

With AWS Step Functions, you are charged per _____ _____.

Within AWS Step Functions, workflows are defined using _____.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Ruth started a non-profit that assigns volunteers to opportunities
- Recently their database server went down and users were unable to sign up
- While the situation is better, there is still some downtime expected in the future
- She wants to explore an AWS service that could prevent lost user signups
- What service would you recommend to Ruth?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Jessi created a list of onboarding steps for new customers for their new app
- These steps detail integrations with their CRM, emails to the user, and analytics
- Jessi is worried about the time it will take to build all of this from scratch
- Is there an AWS service that can help with this approach?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Roger's company is an eCommerce company building a custom platform
- They are still adding new functionality
- He wants aspects of the platform to listen for events like orders and refunds
- They don't yet know all of the elements that would need to respond to events
- Is there a service that would allow current and future parts of the platform to listen for these events?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Management and Governance Services

Learning Outcomes

- Understand the benefit of AWS CloudTrail
  - Know where CloudTrail logs can be stored
- Know what services can help you monitor your AWS infrastructure
  - Amazon CloudWatch
  - AWS Config
- Be able to explain the purpose of AWS Systems Manager
- Be able to explain the value of launching infrastructure with AWS CloudFormation
- Be able to explain the purpose of AWS Control Tower

Helpful Links

- AWS CloudTrail
- Amazon CloudWatch
- AWS Config
- AWS Systems Manager
- AWS CloudFormation
- AWS Control Tower
- AWS OpsWorks

AWS CloudTrail

"_____ provides event history of your AWS account activity, including actions taken through the AWS Management Console, AWS SDKs, command line tools, and other AWS services." - Amazon Web Services

CloudTrail inserts an audit trail in an _____ or into _____.

Amazon CloudWatch and AWS Config

Fill in the following table by entering the service name based on the description:

Service	Description
	Provides metrics, logs, and alarms for infrastructure
	Continually evaluates infrastructure against a set of rules
	Provides operational data and automation across infrastructure

_____ allows for custom dashboards based on collected metrics.

"_____ continuously monitors and records your AWS resource configurations and allows you to automate the evaluation of recorded configurations against desired configurations." - Amazon Web Services

AWS Config provides specific _____ with rules for specific compliance standards.

AWS Systems Manager

_____ provides multiple tools that make it easier to manage your AWS infrastructure.

AWS CloudFormation

_____ is a managed service for provisioning infrastructure based on templates. The templates can be written in _____ or _____.

_____ is a feature that enables you to find changes in your infrastructure after it was launched by CloudFormation.

AWS OpsWorks

"AWS OpsWorks is a _____ _____ service that provides managed instances of _____ and _____.

AWS Organizations and Control Tower

AWS Control Tower - A service to create a _____ environment on AWS that follows the recommended best practices in operational efficiency, security, and governance. It provides a way to create new AWS accounts based on _____ .

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Elliott is an operations engineer at a financial services company
- He recently discovered that someone had disabled a security setting on a server
- He is concerned that events like this might go unnoticed until a breach
- Which service would allow the organization to continually track configuration of infrastructure?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- James is the lead architect at a SaaS company
- They will be launching a new application that includes several components
- He is looking to minimize manual work required when creating infrastructure
- What service would enable James to automate much of this effort?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Candace is the CTO at a manufacturing company
- A cloud server needed to support their manufacturing process was deleted
- They want to make sure the follow up with the person who deleted this instance
- Which service could show the individual that deleted this specific server?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Understanding AWS Core Services. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

For More Information

As a part of creating this course, the following resources from Amazon Web Services were referenced. If you want to learn more, feel free to go check out these resources directly:

- AWS Services
- Amazon EC2
- AWS Lambda
- Amazon Aurora
- Amazon DynamoDB
- AWS Config

Introduction to Security and Architecture

AWS Architecture Core Concepts

Learning Outcomes

- Policies and Models
  - Acceptable Use Policy
    - You should know what this policy covers and the types of things it doesn't allow
  - Shared Responsibility Model
    - You should be able to know what kind of areas are the responsibility of the custom and which are for AWS
- Well-architected Framework
  - Know the type of information included in the framework and how it could be useful
  - Know the different pillars of the framework
- High-availability and Fault Tolerance
  - Understand the difference between these terms
  - Know the services that can help enable these

Helpful Links

- AWS Acceptable Use Policy
- AWS Shared Responsibility Model
- Well-architected Framework
- Services
  - AWS Config
  - AWS Artifact
  - Amazon GuardDuty

Security and Architecture Overview

_____ : AWS's policy for acceptable and unacceptable uses of their cloud platform. All users must agree with this policy to have an account on the platform.

Shared Responsibility Model

"_____ and _____ is a shared responsibility between AWS and the customer." -- Amazon Web Services

AWS Responsibility	Customer Responsibility
Global data centers and underlying network	
	Operating system, network, and firewall configuration
Patching cloud infrastructure and services	

AWS Well-architected Framework

Pillars of the Well-architected Framework

1. _____ - Running and monitoring systems for business value
2. _____ - Protecting information and business assets

3. _____ - Enabling infrastructure to recover from disruptions
4. _____ - Using resources efficiently to achieve business value
5. _____ - Achieving minimal costs for the desired value

High-availability and Fault Tolerance

Some services that support fault tolerance:

1. _____
2. _____

Compliance

Services that support compliance:

1. _____ - Continually monitor AWS resources and provides conformance packs for specific compliance standards
2. _____ - Portal that provides self-service access to compliance reports
3. _____ - Provides intelligent threat detection

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Jane's company is building an application to process credit cards
- They will be processing cards directly and not through a service
- Their bank needs a PCI DSS compliance report for AWS
- Where would Jane go to get the information?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Tim's company is considering a transition to the cloud
- They store personal information securely in their system
- Tim's CTO has asked what the company's responsibility is for security
- What would you tell Tim's CTO?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Ellen is a solutions architect at a startup
- They are building a new tool for digital asset management
- Ellen is curious how to best leverage the capabilities of AWS in this application
- What resources would you recommend for Ellen and her team?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Introduction to Security and Architecture. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

AWS Identities and User Management

Learning Outcomes

- AWS Identity & Access Management (IAM)
  - Understand the purpose of the service
  - Know about the three different IAM identity types and know when you would use each one
  - Know about identity federation for IAM
  - Know about IAM best practices
    - Multi-factor Authentication
    - Least Privilege Access
- Amazon Cognito
  - Know about why you would use the service
  - Know about social logins with Cognito and supported identity providers

Helpful Links

- AWS Identity and Access Management
- Amazon Cognito

Summary

_____ : When granting permission for a user to access AWS resources, you should grant them the minimum permissions needed to complete their tasks and no more.

Introduction to AWS IAM

AWS IAM Identities

Please fill in the correct identities for the following descriptions:

Account for a single individual to access AWS resources

Allows you to manage permissions for a group of IAM users

Enables a user or AWS service to assume permissions for a task

Amazon Cognito

List the supported Cognito identity providers:

1.
2.
3.
4.
5.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Sylvia manages a team of DevOps engineers for her company
- Each member of her team needs to have the same access to cloud systems
- It is taking her a long time to attach permissions to each user for access
- What approach would help Sylvia manage the team's permissions?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Edward works for a startup that is building a mapping visualization tool
- Their EC2 servers need to access data stored within S3 buckets
- Edward created a user in IAM for these servers and uploaded keys to the server
- Is Edward following best practices for this approach? If not, what should he do?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- William is leading the effort to transition his organization to the cloud
- His CIO is concerned about securing access to AWS resources with a password
- He asks William to research approaches for additional security
- What approach would you recommend to William for this additional security?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Introduction to Security and Architecture. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Data Architecture on AWS

Learning Outcomes

- On-premise Data Services
  - Understand when you would use each of these
    - AWS Storage Gateway
    - AWS DataSync
- Be able to explain the different data processing services
  - AWS Glue
  - Amazon EMR
  - AWS Data Pipeline
- Be able to define and explain the different data analysis services
  - Amazon Athena
  - Amazon Quicksight
  - Amazon CloudSearch
- Be able to explain each of the following AI / ML services and its use
  - Amazon Rekognition
  - Amazon Translate
  - Amazon Transcribe

Integrating On-premise Data

_____ - Hybrid-cloud storage service that integrates cloud storage into your local network.

AWS Storage Gateway Volume Types
Enter the name and brief definition of each volume type for AWS Storage Gateway:

1.

2.

3.

_____ - Automated data transfer service that uses an optimized protocol for high-speed synchronization to the cloud

Processing Data

Managed Extract, Transform, and Load (ETL) Service

Big-data cloud processing using popular tools

Data workflow orchestration service across AWS services

AWS Glue supports data in _____, _____, _____, and _____.

Supported EMR Tools
Enter the different open source tools supported in Amazon EMR:

1.
2.
3.
4.
5.
6.

AWS Data Pipeline integrates with _____,

_____, _____, _____,

and _____.

Analyzing Data

Data Analysis Services

Enter the service name for each description:

Service Name	Description
	Service that enables serverless querying of data stored within Amazon S3 using standard SQL queries
	Fully-managed Business Intelligence (BI) service enabling self-service data dashboards for data stored in the cloud
	Managed search service for custom applications

Integrating AI and Machine Learning

Enter the service names for the following ML services on AWS:

Computer vision service powered by Machine Learning

Text translation service powered by Machine Learning

Speech to text solution using Machine Learning

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Ruth is a data scientist for a financial services company
- Large-scale data set needs to be processed before analysis
- Ruth doesn't want to manage servers but just wants to define processing
- What service would you recommend to Ruth?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Jessi is a member of the IT team for a biotech company
- She is currently working to identify an approach for controlled lab access
- She wants leverage AI to determine access based on facial imaging
- Is there an AWS service that can help with this approach?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Roger's company sells custom services around machine learning
- His head of sales is trying to find a great way to visualize their sales data
- This data is currently stored in Redshift as their data warehouse
- What AWS service would allow this access to the data by non-technical resources?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Introduction to Security and Architecture. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

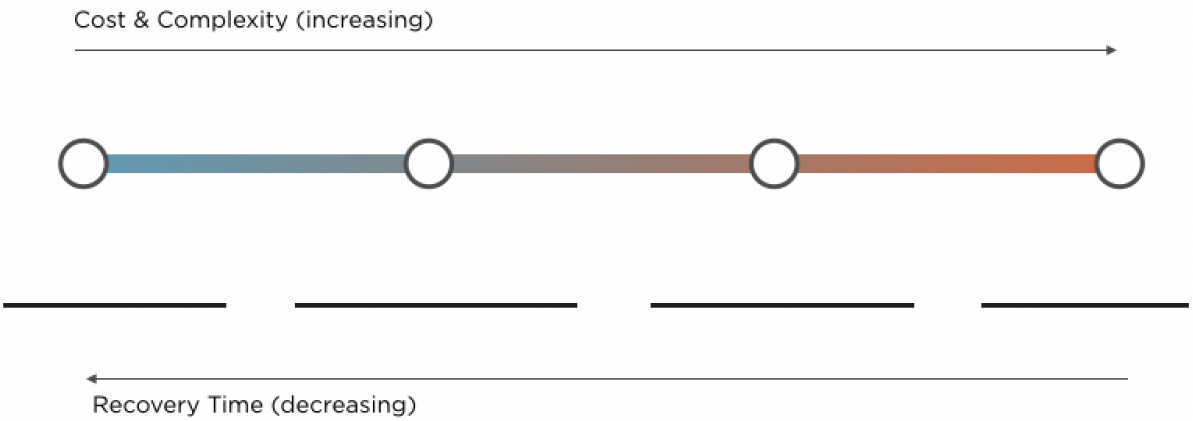
Disaster Recovery on AWS

Learning Outcomes

- Understand the four different recommended architectures for disaster recovery (DR)
  - Backup and Restore
  - Pilot Light
  - Warm Standby
  - Multi-site
- Be able to determine which approach makes sense for an organization based on RTO and RPO

Disaster Recovery Architectures

Enter the correct names for each disaster recovery architecture:



Selecting a Disaster Recovery Architecture

_____ - The time it takes to get your systems back up and running to the ideal business state after a disaster recovery event.

_____ - The amount of data loss (in terms of time) for a production system during a disaster recovery event.

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Roger's company runs several production workloads in AWS
- Roger is tasked with architecting the disaster recovering approach
- His organization wants there to be a seamless transition during an event
- Which disaster recovery approach would Roger's company use for this?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Jennifer's company is a startup
- They do not currently have a disaster recovery approach
- In this case, minimizing cost is more critical than minimizing RTO
- What disaster recovery approach would you recommend to Jennifer?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Eliza is documenting her company's disaster recovery approach
- They keep a few key servers up an running in AWS in case of an event
- These servers have smaller instance types than what production would need
- Which disaster recovery approach most closely matches this scenario?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Introduction to Security and Architecture. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Architecting Applications on Amazon EC2

Learning Outcomes

- Scaling EC2
  - Understand the difference between horizontal and vertical scaling
  - Explain services that support scaling
    - Auto-scaling groups
    - Elastic Load Balancing
- Limiting Access to EC2 Instances
  - Understand the different approaches for controlling access
    - Security Groups
    - ACL's
    - AWS VPN
- Know the AWS services that provide protection from hacks and attacks
  - AWS Shield
  - Amazon Macie
  - Amazon Inspector
- Understand the different ways to launch pre-existing experiences on EC2
  - AWS Service Catalog
  - AWS Marketplace
- Be able to define the different services in the suite of developer tools on AWS
  - AWS CodeCommit
  - AWS CodeBuild
  - AWS CodeDeploy
  - AWS CodePipeline
  - AWS CodeStar

Scaling EC2 Infrastructure

_____ - You "scale up" your instance type to a larger instance type with additional resources

_____ - You "scale out" and add additional instances to handle the demand of your application

Fill in the notes on Auto-scaling Groups for EC2:

Amazon EC2 Auto-scaling Groups
Defines the minimum, maximum, and desired number of instances

_____ - Service that manages secrets (such as passwords, keys, tokens, etc...) used in your custom applications on AWS. It also supports auto-rotation of credentials on supported AWS services.

Controlling Access to EC2 Instances

Fill in the solutions for limiting access to EC2 instances based on the included descriptions:

Solution	**Description**
	Enables firewall-like controls for resources within the VPC
	Controls inbound and outbound traffic for subnets within the VPC
	Secure access to an entire VPC using an encrypted tunnel

Indicate which of the following are characteristics of Security Groups and which are Network ACL's:

Security Group, ACL, or both	Characteristic
	Operates at the instance level
	Works for an entire subnet
	Multiple can be assigned to an EC2 instance
	Can be used to allow or deny traffic
	Controls inbound and outbound traffic

Protecting Infrastructure from Attacks

Fill in the names for the following security services:

Managed DDoS protection service for apps on AWS

Data protection service powered by machine learning

Automated security assessment service for EC2 instances

Deploying Pre-defined Solutions

_____ - Targeted to serve as an organizational service catalog for the cloud

_____ - Enables third-party ISVs to offer configurations for the cloud that can be launched in your account

Developer Tools

Fill in the following service names based on the description:

Service Name	Description
	Fully-managed source control service using Git
	Fully-managed build and continuous integration service on AWS
	Fully-managed deployment service for applications running on Amazon EC2, AWS Fargate, AWS Lambda, and on-premise servers
	Fully-managed continuous delivery service on AWS for automating building, deploying, and testing. Integrates with other developer services
	Workflow tool for automatic creation of a continuous delivery pipeline for a custom application using the other developer services

Scenarios

The following scenarios are presented in the course as a way to explore your understanding of the module. Include your answer here in this outline, as well as your notes on the solution to each scenario.

SCENARIO 1

- Ellen is a solutions architect at a traditional financial services company
- They recently transitioned to AWS
- They want to be sure each department follows best practices
- They want to create compliant IT services that other departments can use
- What service would you recommend for Ellen and her team?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 2

- Tim's company leverages AWS for multiple production workloads
- Recently they have had downtime due to one of their applications failing on EC2
- Tim is looking to avoid downtime if an instance stops responding
- What approach would you recommend for Tim to solve this issue?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

SCENARIO 3

- Jane's company deals with sensitive information from its users
- They have put reasonable policies in place for data stored in S3
- Jane is worried if some of those policies accidentally get changed
- She is also worried of a breach going unnoticed
- What service would you recommend to Jane and her company?

What's Your Answer: _____

Why did you pick this answer:

If you didn't get this one right, what insight did you gain from the explanation:

Module Wrap Up

Review your notes against the completed notes for Introduction to Security and Architecture. Take a minute to write down any areas from this module that you don't fully understand or where you still have questions:

Exam Prep Questions

Exam Prep A

1. Your organization has decided to adopt "infrastructure as code" with AWS CloudFormation for new infrastructure launched into your AWS accounts. Which pillar of the Well-Architected Framework is this recommendation included in?
    a. Operational Excellence
    b. Security
    c. Fault Tolerance
    d. Cost Optimization
2. Your company is moving a self-managed database over to AWS, and it will be running on EC2 for at least 3 years. They want to avoid any large expenses up-front but want to reduce the monthly cost as much as possible. What EC2 pricing model should you recommend?
    a. Dedicated Host
    b. Reserved - 3 year - No Upfront
    c. On-Demand Instance
    d. Reserved - 3 year - Partial Upfront
3. What is the least costly support plan that provides 24/7 access to documentation, whitepapers, and support forums?
    a. Business
    b. Developer
    c. Basic
    d. Enterprise
4. You want to launch multiple EC2 instances that all have the same operating system customizations. What would you need to create so that each of these instances included those customizations?
    a. Amazon S3 Bucket
    b. Custom Amazon Machine Image (AMI)
    c. Amazon Virtual Private Cloud (VPC)
    d. Amazon Elastic File System (EFS)
5. Which managed service could provide distribution of incoming traffic across multiple Amazon EC2 instances?
    a. Amazon Elasticsearch
    b. AWS Elastic Beanstalk
    c. Elastic Load Balancing
    d. AWS Auto Scaling
6. Your organization has decided to experiment with Machine Learning for a specific business problem. Later the same day, the team has a Machine Learning environment up and running in AWS to begin experimentation. Which cloud benefit is illustrated in this scenario?
    a. Loose coupling

   b. Agility
   c. Design for failure
   d. Elasticity
7. Which of the following are pillars of the AWS Well-Architected Framework? (select three)
   a. Fault Tolerance
   b. Operational Excellence
   c. Security
   d. Cost Optimization
   e. High Availability
8. Which element of AWS Global infrastructure consists of multiple Availability Zones?
   a. Edge Location
   b. Region
   c. Point of Presence
   d. Data Center
9. What feature of a Virtual Private Cloud (VPC) works like a virtual firewall for the network?
   a. Subnets
   b. Virtual Private Gateways
   c. Security Groups
   d. Internet Gateways
10. Which AWS service enables organizations to create a private link between their data center and an AWS region that doesn't travel over the public Internet?
   a. AWS Direct Connect
   b. AWS Site to Site Connect
   c. AWS Cloud VPN
   d. Amazon Direct Cloud
11. Which service provides nearly limitless object storage with multiple storage classes covering use cases from frequent access to archive storage?
   a. Amazon S3
   b. AWS CloudStorage
   c. Amazon EFS
   d. Amazon EBS
12. Which service can give you a secure and encrypted connection to a Virtual Private Cloud (VPC) on AWS over the public Internet?
   a. AWS Direct Connect
   b. AWS GuardDuty
   c. AWS Virtual Private Network (VPN)
   d. AWS Key Management Service
13. Your organization frequently deploys a standard web application stack for new applications. What AWS service would enable them to define this common infrastructure in code and also detect any drift to the stack configuration of a deployed application?
   a. AWS CloudFormation
   b. AWS Resource Manager

    c. AWS CodeCommit
    d. AWS CodeDeploy
14. Which pricing factors are considered when using AWS Lambda? (choose two)
    a. Duration (based on the memory allocated)
    b. Number of instances
    c. Maximum concurrent instances
    d. Number of requests
    e. Instance size
15. Which architectural principle is illustrated in the following statement: "Isolate the behavior of a component from other components that depend on it, increasing resiliency and agility."
    a. Least privilege access
    b. High availability
    c. Tight coupling
    d. Loose coupling
16. Which tool can be used to automate the creation and management of multiple account AWS environments?
    a. AWS Cost Explorer
    b. Identity and Access Management
    c. AWS Directory Service
    d. AWS Control Tower
17. Which AWS service allows you to manage multiple AWS accounts, simplify billing for all accounts, and apply policies for governance of those accounts?
    a. AWS Directory Service
    b. AWS Accounts
    c. AWS CloudFormation
    d. AWS Organizations
18. Which AWS managed service provides the ability to setup and manage relational databases for the most common database engines?
    a. AWS Database Migration Tool
    b. Amazon Relational Database Service (RDS)
    c. Amazon SimpleDB
    d. Amazon DynamoDB
19. What AWS service can be leveraged in the deployment of your custom software to Amazon EC2 and AWS Fargate?
    a. AWS CodeCommit
    b. AWS CodeDeploy
    c. AWS CodeGuru
    d. AWS CodeArtifact
20. Which service provides a NoSQL cloud database with single-digit millisecond latency that operates as a key-value and document store?
    a. Amazon SimpleDB
    b. Amazon Aurora
    c. Amazon DynamoDB
    d. Amazon EBS

21. Which of the following would not be factored into a TCO comparison analysis of switching to the cloud from a traditional data center?
    a. Cost of purchasing data storage hardware
    b. Custom software development
    c. Utility costs for data center
    d. Cost of purchasing servers
22. Within the Shared Responsibility Model, which areas would be the responsibility of the customer? (choose three)
    a. Management of Edge Locations
    b. Encryption of data in transit
    c. User access management
    d. Data center network connectivity
    e. Encryption of data at rest
23. Which disaster recovery approach would result in the lowest cost?
    a. Backup and Restore
    b. Warm Standby
    c. Multi-site
    d. Pilot Light
24. How will implementing elasticity in your cloud application reduce your TCO over implementing it in your traditional data center?
    a. Increasing compute capability
    b. Increasing unused capacity
    c. Reducing unused capacity
    d. Increasing speed of data transfer
25. Which fully managed AWS service uses machine learning to both detect and protect your data that is stored in AWS?
    a. AWS CloudFormation
    b. AWS GuardDuty
    c. Network Access Control Lists (ACL's)
    d. Amazon Macie
26. You are looking to move a new web application into the cloud. Your organization has asked for a cost estimate on this application. What tool could you use to estimate costs for this new cloud workload?
    a. AWS Cost Explorer
    b. AWS Trusted Advisor
    c. AWS Pricing Calculator or Simple Monthly Calculator
    d. Cost and Usage Reports (CUR)
27. Which of the following services is a highly-available managed domain name system (DNS) service?
    a. Amazon Domain Name Service
    b. Amazon Route 53
    c. AWS Elastic Beanstalk
    d. AWS Elastic Routing

28. Your organization is working on an incident management and investigation policy now that they have moved a pilot application onto the cloud with AWS. Which pillar of the AWS Well Architected Framework recommends the creation of this policy?
    a. Performance Efficiency
    b. Security
    c. Reliability
    d. Cost Optimization
29. According to the concept of least privilege access, what should you set up when adding permissions for an IAM user?
    a. Grant a user admin permissions on a separate AWS account that is a part of your AWS Organization
    b. Grant the user permissions to access all services in the environment
    c. Grant the user has permissions for only the items needed by that user to perform a task
    d. Grant the user permissions for what they will need along with commonly used services to avoid repeated modification to policies
30. You are looking to launch a static website with minimal configuration. Which of the following AWS services provides this feature?
    a. Amazon CloudWatch
    b. Amazon Redshift
    c. AWS CodeDeploy
    d. Amazon S3
31. Which online tool provides guidance in following AWS best practices by providing personalized recommendations for your cloud workloads?
    a. AWS Trusted Advisor
    b. AWS Personal Health Dashboard
    c. AWS Well-Architected Framework
    d. Amazon CloudWatch
32. Your organization is looking to review best practices for AWS prior to implementing their first cloud application. What resource would best meet this need?
    a. AWS Trusted Advisor
    b. AWS CloudFormation
    c. AWS Well-Architected Framework
    d. AWS Marketplace
33. What is the minimum AWS support plan that provides the complete set of AWS Trusted Advisor checks?
    a. Developer
    b. Business
    c. Enterprise
    d. Basic
34. Which AWS service enables you to protect your web application by using a rule-based system to detect traffic and actions that should be blocked?
    a. Amazon CloudWatch
    b. Amazon Macie
    c. AWS Web Application Firewall (WAF)

    d. AWS GuardDuty
35. Your US-based team wants to expand an internal application to your office in Singapore. They are able to take the application and spin up a version in the ap-southeast-1 region. Which benefit of cloud computing is best illustrated with this scenario?
    a. Stop guessing capacity
    b. Go global in minutes
    c. Stop spending money running and maintaining data centers
    d. Trade capital expense for variable expense
36. Within the Shared Responsibility Model, what area would be the responsibility of the customer?
    a. Patching data center network routers
    b. Patching the OS for RDS instances
    c. Data center security
    d. Patching the OS on EC2 instances
37. What will IAM users use to authenticate themselves when using the AWS CLI?
    a. Group credentials
    b. Access keys per IAM user
    c. Username and password
    d. Access keys for the root user
38. What AWS service enables auditing of your AWS account by logging actions taken on your AWS resources?
    a. AWS CloudHSM
    b. AWS CloudFormation
    c. AWS GuardDuty
    d. AWS CloudTrail
39. How can you configure the same permissions for multiple IAM users?
    a. Have multiple users leverage the same IAM user to reduce maintenance
    b. Create an IAM group, assign permissions to the group, and add IAM users to the group
    c. Create an IAM role, assign permissions to the role
    d. Copy and paste the same policy JSON to a unique policy for each user
40. Which AWS service enables you to use your own keys to encrypt data on AWS using a hardware security module (HSM)?
    a. AWS Key Management Service (KMS)
    b. AWS CloudHSM
    c. AWS Identity and Access Management (IAM)
    d. Amazon Macie
41. Your organization is adopting a hybrid approach for storage and wants to leverage the cloud as a backup while having low latency access to data on its local network. Which AWS service could be leveraged for this?
    a. AWS Storage Gateway
    b. Amazon Elastic Block Store (EBS)
    c. Amazon S3 Glacier
    d. Amazon S3

42. Which service provides an in-memory data store that supports both Redis and Memcached?
    a. Amazon Elasticache
    b. Amazon EFS
    c. Amazon RDS
    d. Amazon DynamoDB
43. When deploying an application across multiple availability zones, which design concept are you implementing?
    a. Elasticity
    b. Agility
    c. Design for failure
    d. Cost Optimization
44. Which AWS concept is the definition of the information required to launch an EC2 instance including the contents of the root volume, launch permissions, and block device mapping?
    a. Amazon Machine Image (AMI)
    b. Amazon Elastic Block Store (EBS)
    c. Amazon Elastic Filesystem (EFS)
    d. Amazon EC2 Instance Image (EII)
45. Your organization is looking to test a new web application concept. The team set up an AWS account and infrastructure within a day on which they will build a prototype for this application. Which cloud computing benefit does this illustrate?
    a. Go global in minutes
    b. Stop guessing capacity
    c. Increase speed and agility
    d. Hybrid cloud
46. Which element of the AWS Global Infrastructure is made up of one or more data centers connected by a low latency network with redundant power, networking, and connectivity within an AWS Region?
    a. Edge Location
    b. Regional Edge Cache
    c. Point of Presence
    d. Availability Zone
47. How can you improve the security of your IAM user account?
    a. Setup Amazon Shield for your account
    b. Implement AWS VPN when using the AWS Console
    c. Enable multi-factor authentication
    d. Setup Amazon Macie for your account
48. Your company is looking to perform batch data analysis using an EC2 instance. There is a flexible start and stop time for this workload, and it can stop and restart as needed. What would be the most cost effective EC2 pricing model given these requirements?
    a. Spot Instance
    b. On-Demand Instance
    c. Dedicated Host
    d. Reserved Instance

49. What tool would you leverage to make a case within your organization for moving to the cloud from a traditional data center?
    a. TCO Calculator
    b. Cost and Usage Reports (CUR)
    c. AWS Pricing Calculator or Simple Monthly Calculator
    d. AWS Cost Explorer
50. When you deploy your application across multiple AWS availability zones, which architectural principle are you implementing?
    a. Loose coupling
    b. Cross-region reliability
    c. Tight coupling
    d. High availability
51. Your company needs to launch a MySQL database in the cloud for a web application. They will need to have access to the underlying operating system to install OS-level optimizations. What solution would meet these requirements?
    a. Utilize DynamoDB
    b. Utilize Amazon Aurora on Amazon RDS
    c. Utilize MySQL on Amazon EC2
    d. Utilize Amazon SimpleDB
52. Your company is migrating to the cloud. You have multiple licenses for server software that is licensed per server. Which EC2 pricing model should you choose for the instances when you launch them in AWS?
    a. Consolidated Instance
    b. Dedicated Host
    c. Spot Instance
    d. Reserved Instance
53. Which tool enables you to visualize current AWS costs and predict future costs based on current usage?
    a. AWS Pricing Calculator
    b. AWS Trusted Advisor
    c. Cost and Usage Reports (CUR)
    d. AWS Cost Explorer
54. Which AWS service would enable you to share reserved instances across multiple accounts that your company manages?
    a. AWS Organizations
    b. Amazon CloudWatch
    c. AWS CloudFormation
    d. AWS Direct Connect
55. You want to have email support within business hours from AWS for an application you are building. What is the minimum support plan that provides this?
    a. Basic
    b. Enterprise
    c. Business
    d. Developer

56. Which service provides a highly-available and elastic NFS file system for both cloud-based and on-premise servers?
    a. Amazon S3 Glacier
    b. Amazon S3
    c. Amazon Elastic File System (EFS)
    d. Amazon Elastic Block Store (EBS)
57. If you wanted to engage AWS resources for a paid engagement to assist in a cloud migration, which team would you leverage?
    a. AWS Professional Services
    b. AWS Marketplace
    c. AWS Service Gateway
    d. AWS Partner Network Consulting Partners
58. Your company is moving their data storage from their data center into the cloud. They are evaluating different approaches for data warehousing. What AWS service provides a managed data warehousing solution that supports columnar storage up to a petabyte scale?
    a. AWS Database Migration Service
    b. Amazon DynamoDB
    c. Amazon SimpleDB
    d. Amazon Redshift
59. Within the Shared Responsibility Model, what responsibility is shared by both the customer and AWS?
    a. Customer Data
    b. Data Center Physical Security
    c. Configuration Management
    d. Edge Location Management
60. Which of the following is an economic benefit of migrating to the cloud?
    a. Eliminating Operational Expenditures (opex)
    b. Increased Capitalized Expenditures (capex)
    c. Increased Operational Expenditures (opex)
    d. Reduced Total Cost of Ownership (TCO)
61. Which AWS service provides the ability to assess and audit configuration of the AWS resources you have deployed in your account?
    a. Amazon CloudWatch
    b. AWS Config
    c. AWS Identity and Access Management (IAM)
    d. AWS GuardDuty
62. Your company has deployed a new web application across multiple availability zones for high availability. What pillar of the Well-Architected Framework recommends this approach?
    a. Operational Excellence
    b. Fault Tolerance
    c. Reliability
    d. Cost Optimizations

63. Which of the following services could assist in migrating your data from your on-premise data center into AWS?
    a. AWS CloudFormation
    b. Amazon CloudWatch
    c. AWS Snowball
    d. AWS Cloud Migrate
64. When your team moved an application into the cloud, they implemented elasticity so that the application could scale to meet the current user demand. Which cloud computing benefit is best illustrated with this scenario?
    a. Stop spending money running and maintaining data centers
    b. Go global in minutes
    c. Trade capital expense for variable expense
    d. Stop guessing capacity
65. Your organization is looking to leverage both their traditional data center and the public cloud. What type of cloud architecture does this describe?
    a. Isolated cloud
    b. Private cloud
    c. Public cloud
    d. Hybrid cloud

Exam Prep B

1. Which of the following services would be considered services to leverage in a serverless architecture? (select three)
    a. Amazon EC2
    b. AWS Lambda
    c. Amazon SQS
    d. Amazon Elasticache
    e. Amazon DynamoDB
2. Which of the following is an economic benefit of utilizing the cloud?
    a. No up front capitalized expenditures (capex)
    b. No operational expenditures (opex)
    c. Cost is unrelated to usage
    d. Increased TCO
3. You will be testing the migration of an on-premise web server to the cloud. You plan to have this instance up for a few weeks while you verify its performance. Which EC2 pricing model should you use?
    a. Reserved Instance
    b. Dedicated Instance
    c. On-Demand Instance
    d. Spot Instance
4. Your company is launching a new EC2 web server that will be running consistently for at least a year. The company wants to find maximum cost savings for this instance. What pricing model should they choose?
    a. Spot Instance
    b. Reserved Instance - 1 year - No Upfront
    c. Reserved Instance - 1 year - All Upfront
    d. Dedicated Instance
5. Your organization is looking to develop a single tool to manage deployments both on-premise and in the cloud. Which of the following AWS services could be leveraged for this?
    a. AWS OpsWorks
    b. Amazon S3
    c. AWS CodeBuild
    d. AWS CodePipeline
6. Which EC2 pricing model provides the potential for the most cost savings if your workload is flexible?
    a. Spot Instance
    b. Reserved Instance
    c. On-Demand Instance
    d. Dedicated Host
7. Which services can be leveraged to support a hybrid cloud approach? (select two)
    a. AWS Lightsail

   b. AWS Lambda
   c. AWS Cloud9
   d. Amazon Route 53
   e. AWS Storage Gateway
8. Which of the following is an economic benefit of moving into the cloud?
   a. No up front capitalized expenditures (capex)
   b. No variable costs
   c. No operational expenditures (opex)
   d. Increased capex and reduced opex
9. Which AWS service enables you to implement "infrastructure as code" for your AWS environments?
   a. AWS EC2
   b. AWS RDS
   c. AWS CodeCommit
   d. AWS CloudFormation
10. Which of the following are pillars of the AWS Well-Architected Framework? (select three)
   a. Cost Optimization
   b. Infrastructure as Code
   c. Operational Excellence
   d. Loose Coupling
   e. Performance Efficiency
11. Which of the following are categories of recommendations provided by AWS Trusted Advisor? (choose three)
   a. Cost Optimization
   b. Fault Tolerance
   c. Performance
   d. Least Privilege Access
   e. High Availability
12. Which element of AWS global infrastructure enables caching of assets in a global content delivery network to reduce latency for end users?
   a. Local Zone
   b. Availability Zone
   c. Edge location
   d. Region
13. Your organization has launched multiple EC2 instances into a VPYou need a secure way to access these servers over the public Internet. What would be one approach that you could take that would align with security best practices?
   a. Use AWS Direct Connect
   b. Open up the needed ports to all IP addresses
   c. Remove all restrictions from the Network ACL's
   d. Setup AWS VPN for the VPC
14. Your organization is moving a web application that leverages MySQL into the cloud. Which approach would enable you to minimize the management tasks for this database without modifying the database interactions?

    a. Utilize the AWS Database Migration Service
    b. Utilize DynamoDB
    c. Utilize MariaDB on Amazon RDS
    d. Utilize Amazon Aurora on Amazon RDS
15. Which resource provided by AWS provides a collection of best practices for building applications and solutions in the cloud across five pillars?
    a. AWS Marketplace
    b. AWS Well-Architected Framework
    c. AWS SaaS Factory
    d. AWS Forums
16. Which of the following are economic benefits of switching to the cloud from a traditional data center? (choose three)
    a. Reduced Total Cost of Ownership (TCO)
    b. Lower variable Operational Expenditures (opex)
    c. Eliminating Operational Expenditures (opex)
    d. Increased Operational Expenditures (opex)
    e. No need for up front Capitalized Expenditures (capex)
17. Your organization needs to store roughly 2 TB of data for two years to meet compliance requirements. This data will rarely need to be accessed, but in the event of an audit, it will need to be recovered within a few days. What would be the most cost effective solution for this use case?
    a. Amazon S3 Infrequent Access
    b. Amazon EFS
    c. Amazon EBS
    d. Amazon S3 Glacier
18. What feature of AWS Organizations enables you to receive a single bill for all member accounts?
    a. Cost Explorer
    b. Cost and Usage Report
    c. Reserved Billing
    d. Consolidated Billing
19. Which disaster recovery approach would result in the least downtime during a disaster recovery event?
    a. Backup and Restore
    b. Pilot Light
    c. Warm Standby
    d. Multi-site
20. What AWS service can be leveraged to fully automate your build, test, and deploy pipeline for your custom software projects?
    a. AWS CodeArtifact
    b. AWS CodeCommit
    c. AWS X-Ray
    d. AWS CodePipeline
21. Which AWS service enables you to view, analyze, and alert on logs, metrics, and events from your infrastructure deployed on AWS?

   a. Amazon Logs
   b. Amazon Elastic Block Store (EBS)
   c. Amazon CloudWatch
   d. AWS Identity and Access Management (IAM)

22. Your company utilizes resource tags to properly attribute expenses to specific applications and departments. This data then allows your organization to analyze all AWS spending by these categories. Which pillar of the AWS Well-Architected Framework recommends this approach?
   a. Cost Optimization
   b. Security
   c. Reliability
   d. Operational Efficiency
23. What features of Virtual Private Clouds (VPC's) enable you to limit access to your network? (select two)
   a. Network Load Balancers
   b. AWS CloudFormation
   c. Security Groups
   d. Network Access Control Lists (ACL's)
   e. Amazon EBS Volumes
24. Which service provides a global content delivery network (CDN) that leverages the edge locations in the AWS Global Infrastructure to enable reduced latency when sending content to end users?
   a. AWS Content Delivery
   b. Amazon CloudFormation
   c. Amazon Content Network
   d. Amazon CloudFront
25. Which tool would enable you to check if you are following AWS best practices for cost optimization on your current workloads?
   a. AWS Trusted Advisor
   b. AWS Pricing Calculator or Simple Monthly Calculator
   c. Cost and Usage Reports (CUR)
   d. AWS Cost Explorer
26. Your organization is two months into a cloud transition, and a majority of systems have been migrated. Based on your current workload, you want to visualize current spend by AWS service as well as predicting future costs for this workload. What tool should you leverage?
   a. TCO Calculator
   b. AWS Cost Explorer
   c. AWS Pricing Calculator
   d. Cost and Usage Reports (CUR)
27. Which of the following is an economic benefit of leveraging the cloud?
   a. Elimination of variable operational expenditures (opex)
   b. Variable operational expenditures (opex) are tied to usage
   c. Increased up front capitalized expenditures (capex)
   d. Variable operational expenditures (opex) costs are unrelated to usage

28. Which managed AWS service enables you to leverage your own encryption keys for your data with AWS services?
    a. AWS GuardDuty
    b. AWS Identity and Access Management (IAM)
    c. AWS Key Management Service (KMS)
    d. Amazon Macie
29. Where can organizations find pre-configured software from independent software vendors to run in their AWS environments?
    a. AWS Marketplace
    b. AWS CloudFormation
    c. Amazon CloudFront
    d. AWS SaaS Factory
30. Which of the following services is considered global (and not region-specific)?
    a. AWS Direct Connect
    b. Amazon Route 53
    c. AWS CloudFormation
    d. Amazon S3
31. Your organization has adopted a serverless approach for new applications. By doing this, you have decreased the amount you need to build and maintain. What pillar of the Well Architected Framework recommends this approach?
    a. Fault Tolerance
    b. Performance Efficiency
    c. Reliability
    d. Cost Optimization
32. Which billing tool provides detailed usage and costs data in an Amazon S3 bucket?
    a. TCO Calculator
    b. Cost and Usage Reports (CUR)
    c. AWS Trusted Advisor
    d. AWS Cost Explorer
33. Within the Shared Responsibility Model, what area would be the responsibility of the customer? (select two)
    a. Providing least-privilege access to AWS resources
    b. Data center employee training
    c. Client-side data encryption
    d. Physical data center access controls
    e. Patching data center network routers
34. With the AWS Shared Responsibility Model, what would be the responsibility of AWS? (choose two)
    a. Managing network connectivity for data centers
    b. Implementing server-side data encryption
    c. Training data center employees
    d. Patching the OS of EC2 instances
    e. Controlling application network access
35. Which of the following is a best practice to follow when creating a new AWS account?
    a. Copy the root user access keys and always use those with the AWS CLI

   b. Verify that multi-factor authentication is disabled for the account
   c. Create a new IAM user that you will use instead of the root user
   d. Make sure that all senior team members have access to the root credentials
36. You have multiple web servers deployed across multiple availability zones. What service would provide the ability to route incoming requests between these servers?
   a. AWS Elastic Beanstalk
   b. Amazon Kinesis
   c. Amazon CloudFormation
   d. Elastic Load Balancing
37. During an audit, you learn that you will need to provide documentation for SOC 1 compliance for an application deployed on AWS. Where will you go to get the AWS compliance report for this certification?
   a. Your AWS Technical Account Manager (TAM)
   b. AWS Marketplace
   c. AWS Compliance Hub
   d. AWS Artifact
38. After research, you determine that for a specific cloud workload it is cheaper to run it on AWS than in your own data center when factoring in hardware costs, setup labor, and maintenance. What cloud computing benefit is best illustrated with this use case?
   a. Benefit from massive economies of scale
   b. Go global in minutes
   c. Increase speed and agility
   d. Stop guessing capacity
39. Which of the following services could assist in migrating your data from your on-premise data center into AWS?
   a. Amazon Relational Database Service (RDS)
   b. Amazon Elastic Block Store (EBS)
   c. AWS Database Migration Service (DMS)
   d. AWS Migration Gateway
40. You have enabled AWS CloudTrail to keep an audit log of all actions taken on your company's AWS accounts. Which pillar of the AWS Well-Architected framework is followed with this implementation?
   a. Reliability
   b. Operational Excellence
   c. Security
   d. Compliance
41. You have chosen to break up a large application into smaller components that utilize SQS queues between each step. Which architectural principle is illustrated by this approach?
   a. Least privilege access
   b. Elastic computing
   c. Loose coupling
   d. Tight coupling
42. Where would you go to access resources to help deploy popular technologies into AWS following best practices including step-by-step deployment instructions?

   a. Amazon S3
   b. Github
   c. AWS CloudFormation
   d. AWS Quick Starts

43. Which element of the AWS Global Infrastructure includes multiple availability zones, enabling you to create fault tolerant applications in the cloud that span multiple availability zones?
   a. Regional Edge Caches
   b. Region
   c. Outposts
   d. Edge Location
44. Which program could you leverage to find trusted third-party consultants that can assist with your AWS workloads?
   a. AWS Marketplace
   b. AWS Partner Network Consulting Partners
   c. AWS Partner Network Technology Partners
   d. AWS Directory Service
45. For auditing purposes your organization requires that all actions performed on AWS infrastructure are logged for at least one year. What AWS service could you use to implement this auditing requirement?
   a. AWS CloudTrail
   b. AWS CloudFormation
   c. Amazon CloudWatch
   d. Amazon Macie
46. Which of the following are features of Amazon S3? (select three)
   a. Static website hosting
   b. Ability to be mounted as an NFS filesystem
   c. Block storage that can be attached to Amazon EC2 instances
   d. Multiple storage classes to support different access needs
   e. Lifecycle rules to transition objects between storage classes
47. What free AWS service enables you to configure specific policies dictating what actions a user, group, or role can perform within your account?
   a. Amazon Macie
   b. AWS Identity and Access Management (IAM)
   c. AWS Security Hub
   d. AWS GuardDuty
48. Within the Shared Responsibility Model, what responsibility is shared by both the customer and AWS?
   a. Decommissioning Data Center Storage Hardware
   b. Patch Management
   c. Networking Traffic Protection
   d. Client-side Data Encryption
49. Which of the following could improve the security of your organization's IAM user accounts?
   a. Setup AWS CloudTrail for your account

   b. Setup the AWS Web Application Firewall (WAF)
   c. Setup a password policy
   d. Disable multi-factor authentication for each account

50. Your organization is currently leveraging MySQL on Amazon RDS for a web application. What AWS service could enable you to cache common queries to reduce the load on the MySQL server?
   a. Amazon CloudFront
   b. Security Groups
   c. Amazon Elasticache
   d. Amazon Direct Connect
51. Which factors should be considered when doing a TCO comparison analysis between a traditional data center and the cloud? (select three)
   a. Custom software development
   b. Cost of servers
   c. Cost of data storage
   d. Project management
   e. Utility costs for data center
52. Your architecture team requires auditing of all resource configuration changes in your AWS account. What AWS service could you leverage to meet this requirement?
   a. Amazon Macie
   b. AWS Config
   c. Amazon S3
   d. AWS GuardDuty
53. Your company is looking to implement a new web application that will be used by millions of your customers. You are concerned with the scalability of the company's current relational database for this application, so you are looking for a managed NoSQL database for this project. Which AWS service provides this capability?
   a. Amazon RDS with Microsoft SQL Server
   b. Amazon DynamoDB
   c. Amazon Aurora
   d. Amazon Redshift
54. Which AWS service provides a managed data warehouse that can operate at a petabyte scale?
   a. AWS Lake Formation
   b. Amazon DynamoDB
   c. Amazon RDS
   d. Amazon Redshift
55. Which managed AWS service provides a safeguard against Distributed Denial of Service (DDoS) attacks?
   a. AWS Config
   b. AWS GuardDuty
   c. AWS Shield
   d. Amazon Macie
56. Which AWS service provides block storage for use with Amazon EC2 instances?
   a. Amazon Elastic Block Store (EBS)

   b. Amazon S3
   c. Amazon Elastic File System (EFS)
   d. AWS Storage Gateway

57. Which service of AWS enables you to take advantage of volume discounts and usage tier discounts across multiple AWS accounts that your company manages?
   a. AWS Cost Explorer
   b. Amazon CloudWatch
   c. AWS CloudFormation
   d. AWS Organizations
58. What is the minimum AWS support plan that provides a dedicated Technical Account Manager (TAM)?
   a. Enterprise
   b. Business
   c. Basic
   d. Developer
59. Your company wants to isolate specific applications to their own AWS account, however, they want to have a single bill that provides a clear breakdown of cost by account. What service would you recommend they use to meet these requirements?
   a. AWS CloudFormation
   b. AWS Lake Formation
   c. AWS Organizations
   d. Amazon CloudWatch
60. Given regulations in some countries that your company operates in, there is a policy to ensure that your application runs on physically isolated virtual machines. What EC2 pricing model should you choose to support this requirement?
   a. On-Demand Instance
   b. Spot Instance
   c. Dedicated Host
   d. Reserved Instance
61. Your organization has refactored an application that was migrated from your data center to the cloud. The application can now automatically allocate new resources to meet user demand. What benefit of the cloud is illustrated in this scenario?
   a. Fault Tolerance
   b. Elasticity
   c. Agility
   d. High Availability
62. Which AWS service enables you to create a logically isolated virtual network that you can define and configure?
   a. Amazon Virtual Private Cloud (VPC)
   b. AWS Elastic Beanstalk
   c. Amazon CloudWatch
   d. Amazon Elastic Network
63. Recently your organization launched a new database using Amazon RDS. You chose to deploy the database across multiple availability zones to ensure the database could still

function even if an availability zone went down. Which architectural principle does this illustrate?

a. Loose coupling
b. Tight coupling
c. Cost optimization
d. High availability

64. Which of the following are benefits of Amazon RDS? (select three)
    a. Provides access to the operating system through SSH
    b. Enables you to easily install customized versions of the database engine
    c. Automatically patches database engine based on configured settings
    d. Can enable high-availability by leveraging multiple availability zones
    e. Provides the ability to implement read replicas for most database engines
65. Your company wants to ensure that they have phone, chat, and email access to AWS support with a response within 1 hour when a production system is down. What is the minimum level of support that would meet this criteria?
    a. Business
    b. Enterprise
    c. Basic
    d. Developer

Appendix: Services Lists

Understanding AWS Core Services: Services List

COMPUTE SERVICES	
Amazon EC2	Service that provides secure and resizable virtual servers on AWS
AWS Elastic Beanstalk	Platform (PaaS) for scaling and deploying web apps and services across a specific list of technologies
AWS Lambda	Service that enables you to use compute resources without having to launch or manage the underlying infrastructure - this is leveraged in serverless architectures *This service is commonly used in a **serverless** architecture.*
CONTENT AND NETWORK DELIVERY SERVICES	
Amazon Route 53	Highly-available AWS Domain Name Service (DNS) service that can be leveraged in creating highly available and fault tolerant applications. *This is a **global** service, and it can be used in a **hybrid cloud** architecture.*
Amazon VPC	Logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define
AWS Direct Connect	Cloud service solution that makes it easy to establish a dedicated network connection from your data center to AWS. This connection does not go over the public Internet.
Amazon API Gateway	Fully managed API management service that handles concepts like authentication, logging, and throttling for your API layer
Amazon CloudFront	Amazon's global Content Delivery Network (CDN) service that enables your users to get content from a server that is closest to them. *This is a **global** service.*
AWS Global Accelerator	AWS networking service that routes your traffic through the AWS global network, increasing the overall speed through optimizations by AWS.
Elastic Load Balancing	Service that enables you to distribute traffic across multiple targets (including EC2, ECS, Lambda).
FILE STORAGE AND DATA TRANSFER SERVICES	
Amazon Simple Storage Service (S3)	Service that provides object storage for objects up to 5 TB in size - with no limit on the total storage

S3 Glacier and Glacier Deep Archive	Archive storage classes for Amazon S3. These are designed for objects you need to keep but don't plan to access.
Amazon Elastic Block Store (EBS)	Persistent block storage designed for use with a single EC2 server. It can scale to support petabytes of data and supports different volume types.
Amazon Elastic File System (EFS)	Fully managed NFS file system designed for Linux workloads with support for petabytes of data. *This service can be used in a **hybrid cloud** architecture.*
AWS Snowball	Petabyte scale data transfer service where a physical device is delivered to your organization and returned by a local carrier then loaded into Amazon S3 *This service can assist in **data migration** into the cloud from your data center.*
AWS Snowmobile	Exabyte scale data transfer service where a ruggedized shipping container is sent to your office then loaded into Amazon S3 *This service can assist in **data migration** into the cloud from your data center.*
APP INTEGRATION SERVICES	
Amazon Simple Notification Service (SNS)	Managed pub/sub (publish / subscribe) messaging service. This can enable fan-out architecture with one message triggering multiple actions. *This service is commonly used in a **serverless** architecture.*
Amazon Simple Queue Service (SQS)	Managed message queue service. This can enable fault tolerant and serverless applications. This supports standard and FIFO (first-in first-out) queues. *This service is commonly used in a **serverless** architecture.*
AWS Step Functions	Manages the orchestration of complex workflows which are defined using Amazon States Language. It can be leveraged in a serverless architecture. *This service is commonly used in a **serverless** architecture.*

MANAGEMENT & GOVERNANCE SERVICES	
AWS CloudTrail	Service that provides audit trail for all services used in an AWS account (across all interaction methods)
AWS CloudFormation	Managed service for launching infrastructure based on templates. This approach is known as *infrastructure as code*. CloudFormation also provides drift detection to know when infrastructure has veered from what is defined in the template.
AWS OpsWorks	An infrastructure configuration management service that provides a managed service for Chef and Puppet.
Amazon CloudWatch	Monitoring and management service that integrates with most AWS services. It provides both metrics and alarms based on those metrics as well as logs

AWS Config	Provides continual analysis of AWS resources to ensure they are meeting rules defined in the service
AWS Systems Manager	Service that provides a collection of tools and insight into operational data for central management of those cloud or on-premise instances.
AWS Control Tower	System that launches a multi-account configuration based on AWS best practices
DATABASE SERVICES & UTILITIES	
Amazon Relational Database Service (RDS)	Managed service for relational databases including support for MySQL, PostgreSQL, MariaDB, Oracle, SQL Server, and Amazon Aurora
Amazon Aurora	MySQL and PostgreSQL compatible database engine for RDS that was built for the cloud
Amazon Aurora Serverless for RDS	An on-demand and auto-scaling version of Amazon Aurora that does not require managing the underlying infrastructure. *This service is commonly used in a **serverless** architecture.*
Amazon DynamoDB	Fully managed NoSQL database service that has extremely low latency and scaling based on configuration. *This service is commonly used in a **serverless** architecture.*
Amazon Redshift	Managed petabyte scale data warehousing solution on AWS
Amazon Redshift Spectrum	Service for querying exabytes of data stored in Amazon S3
Amazon Elasticache	Fully-managed in-memory data store that supports memcached and Redis engines
AWS Database Migration Service (DMS)	Service that enables you to move your data (from popular commercial and open source databases) easily onto the cloud. *This service can assist in **data migration** into the cloud from your data center.*

Intro to Security and Architecture: Services List

COMPLIANCE SERVICES	
AWS Config	Service that enables you to continually monitor your resources for adherence to best practices
AWS Artifact	Portal that provides self-service access to AWS compliance reports and agreements you may have with AWS
Amazon GuardDuty	Fully-managed service that continually monitors your AWS account and resources for potential malicious behavior and anomalies
IDENTITY SERVICES	
AWS Identity and Access Management (IAM)	Service that controls access to AWS resources. This is where you create IAM users, IAM groups, and roles. Policies are attached to identities for permission to access resources.
Amazon Cognito	User directory service for custom applications that can also enable access to AWS resources for your custom applications
DATA SERVICES	
AWS Storage Gateway	Hybrid-cloud storage service that enables companies to take advantage of cloud storage on their local networks
AWS DataSync	Automated data transfer service that efficiently transfer data from your local network into AWS
AWS Glue	Fully-managed **serverless** extract, transform, and load (ETL) service
Amazon EMR	Big-data cloud-based tool suite using popular open source tools including Apache Spark, Apache Hive, Presto, and many others.
AWS Data Pipeline	Data workflow orchestration service that supports multiple AWS services providing extract, transform, and load (ETL) capabilities
Amazon Athena	Service that enables serverless querying of data stored within Amazon S3 using standard SQL queries
Amazon Quicksight	Fully-managed Business Intelligence (BI) service enabling self-service data dashboards for data stored in the cloud
Amazon CloudSearch	Managed search service for custom applications
AI & ML SERVICES	
Amazon Rekognition	Computer vision service powered by Machine Learning that can detect objects in images and video

Amazon Translate	Text translation service powered by Machine Learning that can translate text (either streaming or in batch) into many different languages. It also provides language detection.
Amazon Transcribe	Audio transcription service powered by Machine Learning that can transcribe audio (either streaming or in batch) in many different languages
SECURITY SERVICES	
AWS Shield	Managed Distributed Denial of Service (DDoS) protection service for apps running on AWS
Amazon Macie	Data classification, protection, and monitoring service powered by machine learning for Amazon S3 data
Amazon Inspector	Automated security assessment service for EC2 instances

EC2 AND VPC CAPABILITIES	
Auto Scaling Group	EC2 capability that manages a group of EC2 instances that have rules for automated scaling and management which includes health checks for each member of the group
Elastic Load Balancing	Service that supports routing traffic across multiple targets including EC2 instances, Lambda functions, as well as other targets on AWS
Security Groups	Firewall-like controls for EC2 instances within a VPC that controls access for inbound and outbound traffic. Instances can have multiple security groups
Network Access Control Lists (ACL)	Control for inbound and outbound traffic within a specific subnet in a VPC. Traffic can be allowed or denied based on custom rules
AWS VPN	Service that supports an encrypted tunnel into a VPC. This can support either site-to-site (from your data center into the VPC) or client (from a single computer into the VPC)
AWS Secrets Manager	Service that manages secrets (such as passwords, keys, tokens, etc...) used in your custom applications on AWS. It also supports auto-rotation of credentials on supported AWS services
LAUNCHING PRE-DEFINED INFRASTRUCTURE ON EC2	
AWS Service Catalog	Service for offering your organization's pre-defined IT offerings to other members of your organization in a self-service portal on AWS
AWS Marketplace	Catalog of third-party software offerings that makes it easy to launch pre-defined solutions onto your AWS account from these vendors
DEVELOPER SERVICES	
AWS CodeCommit	Fully-managed source control service using Git

AWS CodeBuild	Fully-managed build and continuous integration service on AWS
AWS CodeDeploy	Fully-managed deployment service for applications running on Amazon EC2, AWS Fargate, AWS Lambda, and on-premise servers
AWS CodePipeline	Fully-managed continuous delivery service on AWS for automating building, deploying, and testing. Integrates with other developer services
AWS CodeStar	Workflow tool for automatic creation of a continuous delivery pipeline for a custom application using the other developer services